The Surface Tension of the Universe

Scott Matheson Hitchcock

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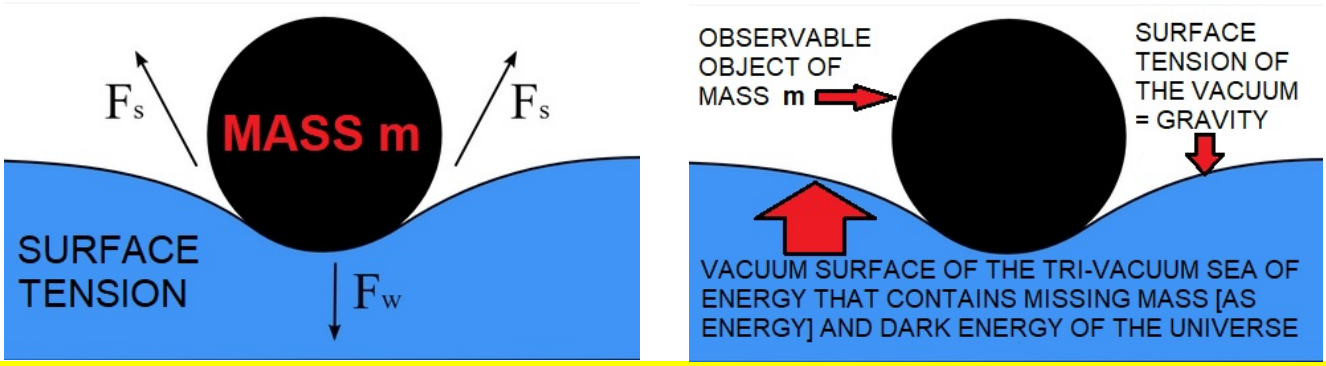

Figure 1: [top left] Particle of mass **m**, floating on the surface of a fluid. F_w is the weight and F_s are surface tension resultant forces. [top right] The total energy of the vacuum creates a surface of the **tri-vacuum** whose 'curvature' is the **gravity** due to the mass **m** *floating on and interacting with the cosmic sea of energy*. The vacuum only appears *empty* to objects like us floating on its surface. The missing mass and dark energy are components of the **tri-vacuum** that defines **space.** **NOTE photons are soliton perturbations of and on the surface of the vacuum.** Therefore they will follow paths near matter that appear to be deflected by the matter in the ***gravitational well*** created by the **vacuum - matter interaction**. This also applies to **gravity waves** which are created by **matter-vacuum-matter interactions** and are also observed as surface phenomena of the **multi-vacuum [tri-vacuum]** space between matter islands floating on a sea of dark vacuum energy [cosmic source of the expansion of the universe] and missing mass and dark [non-vacuum] energy.

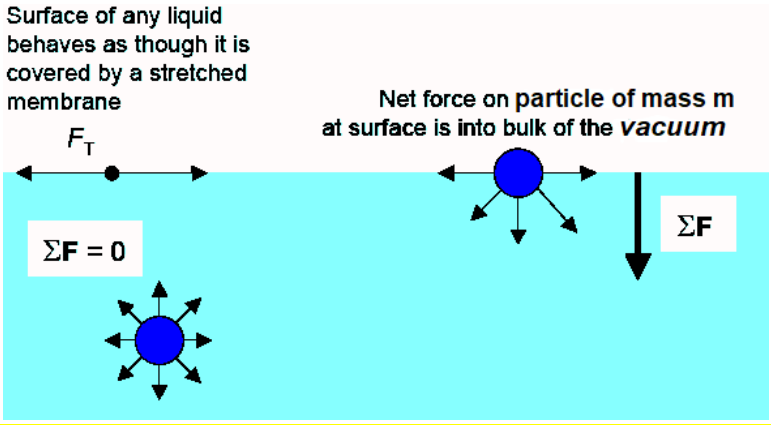

Figure 2: [above] Forces on matter [fundamental particles upwards to cosmic scale objects such as galaxies] due to the **vacuum surface tension** interaction resulting in the curvature [witnessed by the paths of **photons** around massive object see Figure 3 below] of space [vacuum] defining what we know as **gravity**.

In the **multi-vacuum universe model** of the universe first proposed by this author, the three phases of the vacuum act as a collectively as a composite structure that defines *space* in which all the missing mass and dark energy reside as well as many other quantum, macroscopic, and cosmic properties. One of the properties of the collective excitation vacuum state is that it defines space. We find that this nearly infinite sea of vacuum energy [>99 % of the mass of the universe as a whole] has a **surface** that separates and uniquely isolates observable distinct matter [such as us] as objects floating on the surface of the sea of vacuum energy. This surface of the vacuum energy act like a liquid and has a surface tension due to the energy-mass equivalency following from Einsteins equation: $E= mc^2$. This vacuum energy is not a 'false' vacuum but in fact real energy whose surface tension creates gravity. We will show that cosmological expansion and other evolutionary states of matter are the result of the **fluid like properties of the vacuum** but not an **ether**, but a sea of hidden energy with fluid properties such as surface tension, **photon-soliton surface waves**, and **gravity waves**.

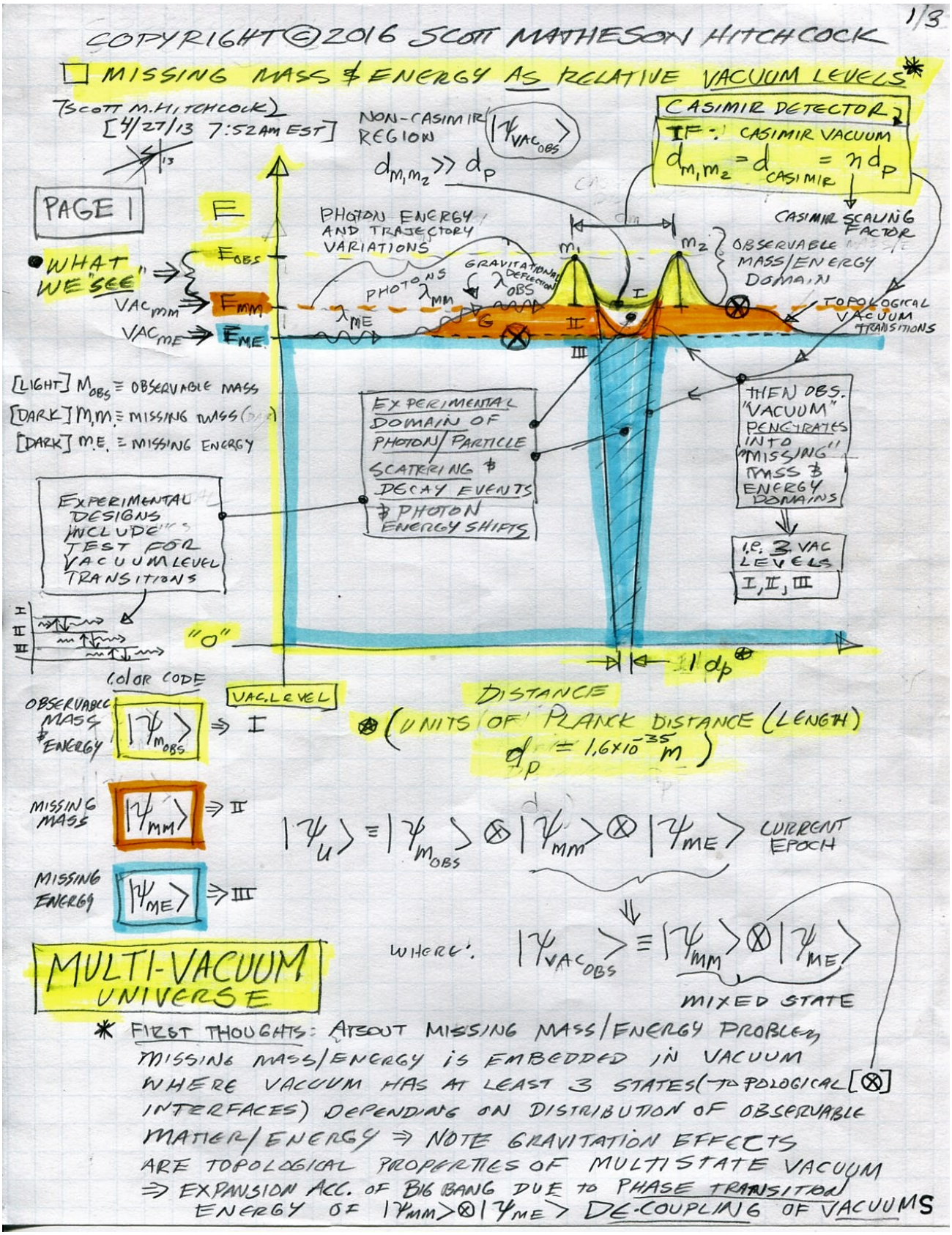

Figure 3: The many properties of the **tri-vacuum** [a.k.a. the **multi-vacuum** subject to possibly more states than the three illustrated above to account for quantum phenomena]. The **photon** is shown as a soliton surface effect of the surface of the tri-vacuum. The soliton nature of the photon is seen in astrophysical spectra whose nature does not change while traversing the vastness of the space [tri-vacuum] between source and detector.

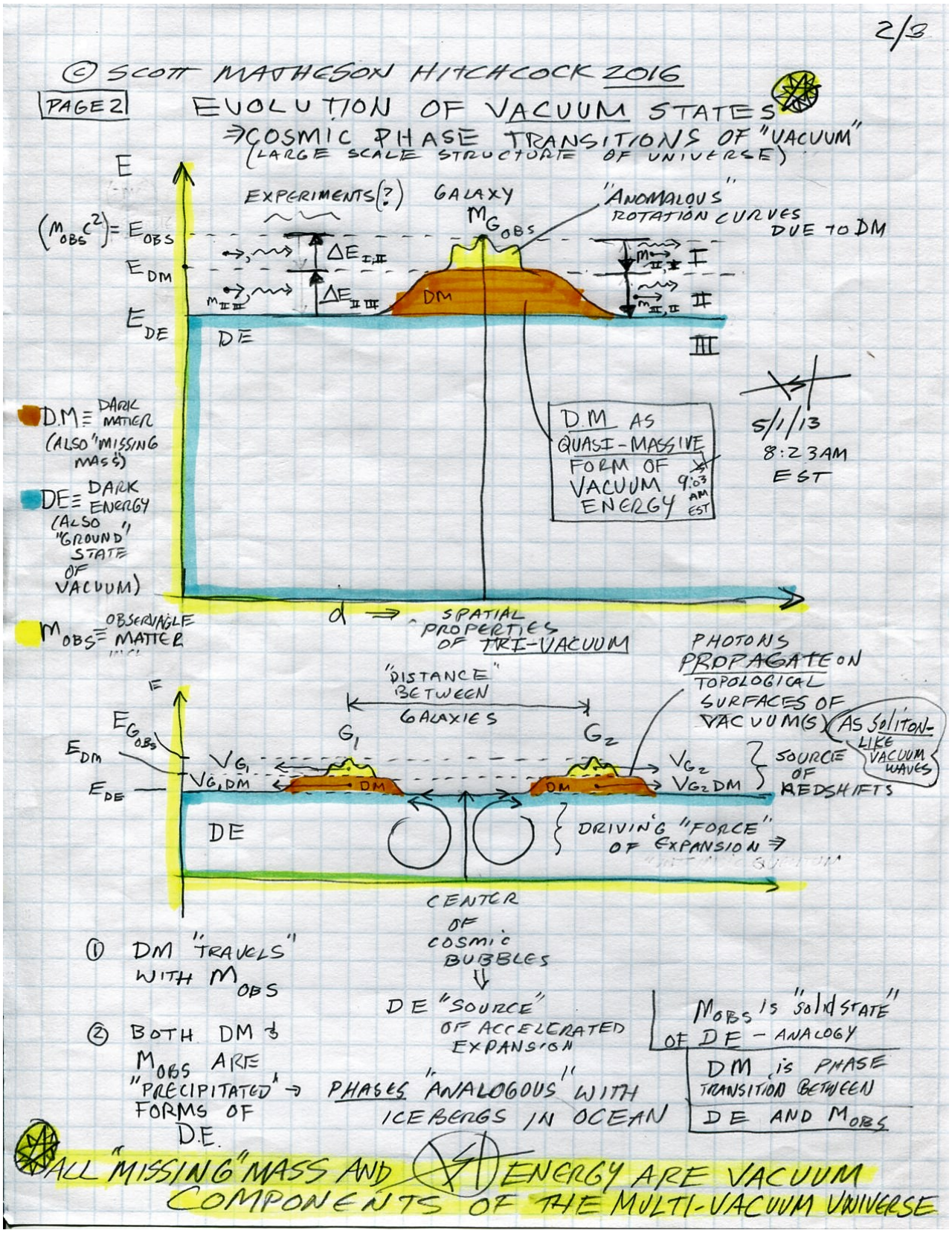

Figure 4: The figure above illustrates states of energy of the vacuum that whose phases add up to the space between material objects. Missing mass, dark matter and cosmic expansion energy in the form of vacuum energy are components of the multi-vacuum.

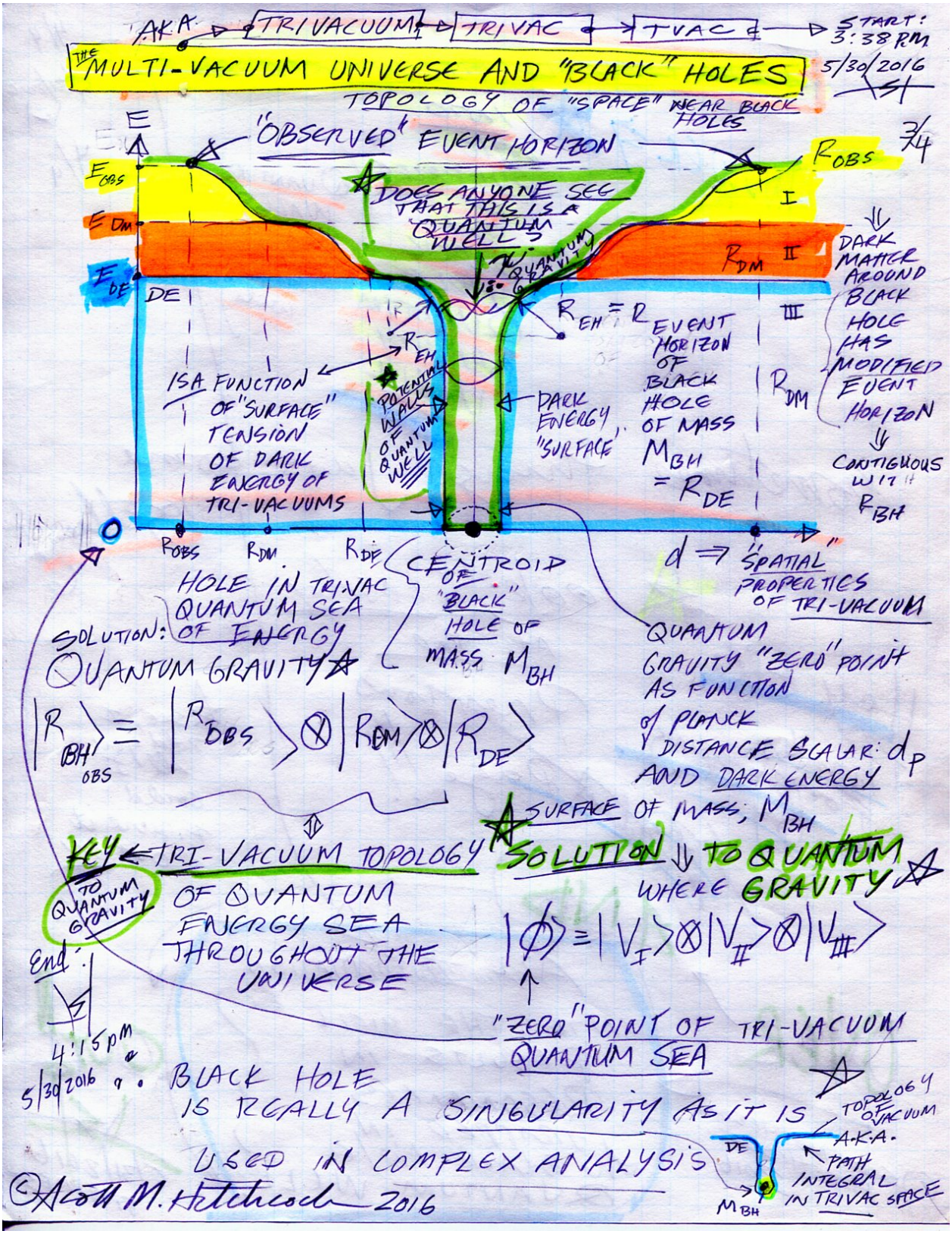

Figure 5: The figure above illustrates how **black holes** function in the context of the tri-vacuum universe. Note that black holes are not tunnels to another part of the universe but dead ends in the vacuum. **Wormholes** do not exist in this model due to the quantum nature of the zero point of the vacuum [actual 'location' of the massive core] that is not normally accessible to an observer. Black holes are then topological anomalies in the sea of vacuum energy.

Conclusions: gravity is a surface tension feature of a complex vacuum that contains missing mass and dark energy. Gravity waves like photons are surface waves of the vacuum. Black holes are singularities [quantum perturbations with diameters on the order of the Planck length] of the vacuum sea caused by mass distorting the vacuum emery. This theory is fully testable. See the figures above for an outline of methods that can prove or disprove this.

Appendix: Photons are vacuum solitons.

Photons, the Cause of Refraction, and the Nature of the Vacuum

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A **photon** is massless, [d] has no electric charge,[18][19] and is a stable particle. **In a vacuum, a photon has two possible polarization states.** The photon (Greek: φῶς, phōs, light) is a type of elementary particle. It is the quantum of the electromagnetic field including electromagnetic radiation such as light and radio waves, and the force carrier for the electromagnetic force. Photons are massless,[a] so they always move at the speed of light in vacuum, 299792458 m/s (or about 186,282 mi/s). The photon belongs to the class of bosons but they are also **vacuum waves**.

A **soliton** or solitary wave is a **self-reinforcing wave packet that maintains its shape while it propagates at a constant velocity.** Solitons are caused by a cancellation of nonlinear and dispersive effects in the medium. (Dispersive effects are a property of certain systems where the speed of a wave depends on its frequency.) Solitons are the solutions of a widespread class of weakly nonlinear dispersive partial differential equations describing physical systems.

The vacuum does not act as a nonlinear and dispersive medium. This is why photons [and gravity waves] are solitons that doe not lose their energy, frequency, or wavelength *if they do not interact with matter or matter generated energy fields* as the propagate throughout the universe.

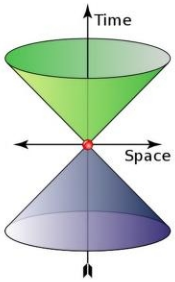
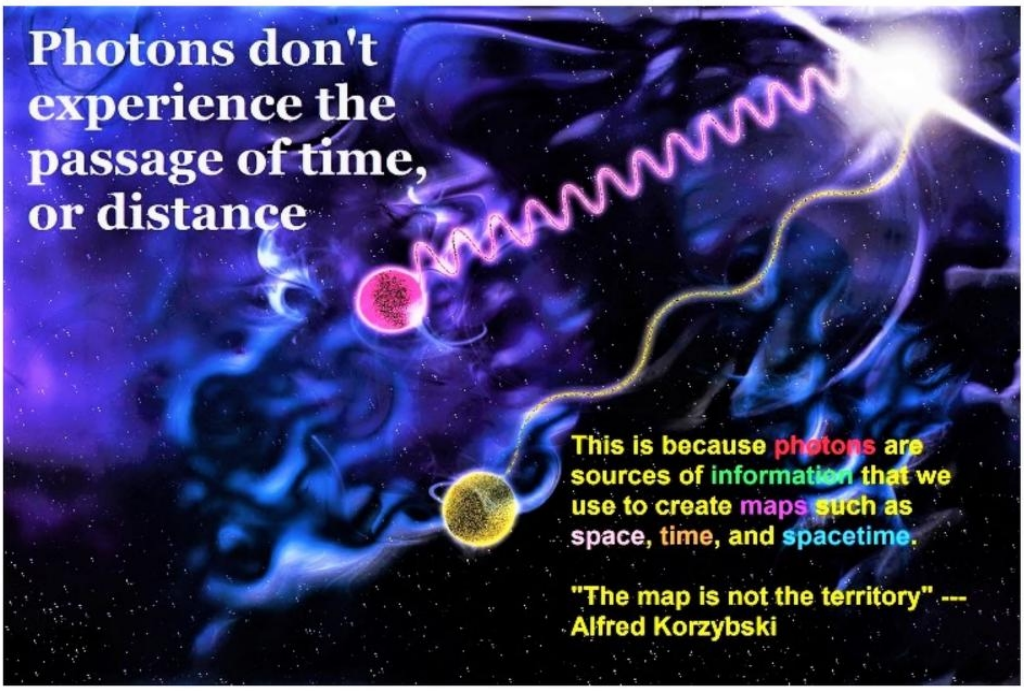


Figure 1. The light cone shows possible values of wave 4-vector of a photon. The "time" axis gives the angular frequency (rad·s−1) and the "space" axis represents the angular wave-number (rad·m−1). *Green and indigo represent left and right polarization. Note: this figure assumes that light cones have a physical reality in which time is a dimension.* This is a false model in that time does not exist as a dimension! The vacuum polarization effects are due to the nature of a photon as a perturbation of the vacuum energy. The photon is a soliton surface effect on and of the vacuum sea of energy which is not empty or a zero point reference!



The **refractive index** and the apparent slowing down of photons near matter is a result of the surface tension of the vacuum around a particle. A result of the enhanced vacuum energy around matter. The refractive index is a measure of the surface tension of the multi-vacuum around matter. Working backwards one can calculate the total energy of the vacuum around matter from the refractive index...i.e. the slowing of photons close to matter is a measure of the topological and therefore the missing mass and dark energy components properties of the vacuum. This points to a way through optics to develop an experimental method to test the theory of the multi-vacuum universe and a way to identify missing mass and dark energy as components of the vacuum. Photons are vacuum solitons. This helps to explain how they can travel through the great distances of space without decaying. The condensed wave packet that is used to describe individual photons is a result of the soliton nature of the energy representing waves on the vacuum surface. This means that the vacuum is a complex sea of energy as discussed in my other papers.

Refraction is the interaction of photonic solitons [vacuum waves] with observable matter resulting from the surface tension of the vacuum that drags the photons to a slower speed thus leading to a trajectory change in side the collective refractive matter. The photons speed up to the carrying velocity [i.e. standard vacuum velocity, c=speed of light, as seen in laboratory environments] of the vacuum when clear of the matter. This is due to the conservation of total energy because the surface tension of the vacuum provides energy to the photon by the matter so the total energy of the photon:

$$\mathbf{E\ [photonic\ soliton] = h\nu_{photon} = E_{[surface\ tension\ of\ vacuum\ near\ matter\ ]} + E_{[refractive\ matter]}}$$

Note that photons are carriers of information when analyzed for their spectral characteristics, direction of their source, intensity of photon bundles and therefore can be used to create maps of change in their sources and therefore time derived as a construction from the information content of these arrows of time. In a sense photons are the links between nodes in a causal networks throughout the vacuum where their function is to act as vectors between the nodes showing the direction and flow of information carried by these ad hoc "arrows of time".

This means that photonic solitons or photons can be used to probe the deep sea of vacuum energy thus examining the proper nature of the vacuum as a reservoir of missing mass, dark energy and cosmological expansion of the universe.

In order to understand how photons properties do not 'age', decay or become 'tired' while propagating through the universe we must see that they are **vacuum waves** [including **gravity waves**] not through empty space but solitons of the vacuum media which is a deep sea of energy that we take for granted to be the zero point energy between islands of observable matter since we, like the photons, are floating on top of this ocean surface of the universe that contains all the missing mass, dark energy and observable cosmological expansion.